Chemistry 129.01 - General Chemistry Workshop - Spring 2017

Week #8

Even though we won't be discussing new material this week, I want you to review some concepts over break that you'll have to apply when we start the second half of the semester. Have a nice break!

Problem Set #8

Due Monday, April 3 (at the beginning of class). Late homework will not be accepted.

1. How many grams of NaOH are needed to prepare 250.0mL of a 0.200M solution?

2. How many mL of a stock solution of 1.59M HCl would you have to use to prepare 5.00L of 0.100M HCl?

3. Balance the following reaction:

   $$HCl_{(aq)} + NaOH_{(aq)} \rightarrow NaCl_{(aq)} + H_2O_{(l)}$$

   What volume of a 0.100M HCl solution is required to completely react with 250.0mL of 0.200M NaCl?

   What is the concentration of the NaCl solution formed?

4. Draw the Lewis structures of the following:
   a. HCl
   b. HClO
   c. $HClO_4$
   d. H_2CO_3
   e. CH_3COOH
   f. HCO_3^-
   g. HSO_3^-
   h. H_3O^+
   i. H_2O
   j. OH^-
   k. CO_3^{2-}

   *Oxyacids have the acidic hydrogen(s) bonded to an oxygen atom.

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Monday, April 3. Introduction to the Equilibrium Constant and Applications

Assigned reading: Sections 13.1, 13.2, 13.4

Today we will start our discussion about chemical equilibrium. A chemical equilibrium occurs when, although the reaction is still occurring, the concentration of reactants and products no longer changes because the reaction is occurring at the same rate forwards and backwards.

Because the concentrations of reactant and product are now constant, we can develop what we call the equilibrium constant, K. We'll look at the difference of expressing K for a homogeneous equilibrium vs. a heterogeneous equilibrium (one or more of the reagents are not in the same phase as the other reagent(s)).

We then will calculate equilibrium concentrations based upon an equilibrium constant in situations where you have to use the stoichiometry of a reaction to predict the final concentrations. On your own, try to work through Examples 13.7 and 13.8. It is very important to actually work through these examples in the book rather than just reading them. Active learning will be much better in this session than passive learning. We will cover this material again in class, but if you are already familiar with the calculation it will make more sense.

1. Define the following concepts and symbols:

   Chemical Equilibrium

   Homogeneous Equilibrium

2. Balance and write the equilibrium expression for the following reaction. Is this equilibrium homogeneous or heterogeneous?

$$C_{(s)} + O_{2\,(g)} \rightarrow CO_{(g)}$$

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Notes: